

## **QUESTIONS REGARDING THE CONTROLLED BURN AT ROCKY FLATS**

### **March 27, 2000**

#### **A. REASON FOR THE CONTROLLED BURN**

##### **➤ Why is the Department of Energy doing this burn?**

The Site's xeric tallgrass prairie was once part of a larger tallgrass prairie ecosystem extending along much of the Colorado Front Range; however, human activity and development have destroyed much of this prairie habitat. Much of the remaining xeric tallgrass prairie in Colorado is found in Boulder and Jefferson counties in small, dispersed parcels. The Colorado Natural Heritage Program (CNHP) identified the Rocky Flats macrosite as the largest known remnant of xeric tallgrass prairie (approximately 1,800 acres) in Colorado, and possibly in North America. Less than 20 occurrences of the xeric tallgrass prairie are known worldwide, and the particular plant association at Rocky Flats is distinctly different from eastern units. The CNHP concluded that the Site contains highly significant natural elements important to Colorado's natural diversity and encouraged the Department of Energy (DOE) to take action to protect and appropriately manage the Site. One action that CNHP recommended was the use of prescribed fire to help restore the species balance in the xeric tallgrass prairie. DOE wants to implement responsible conservation of this rare and valuable prairie resource, and to preserve it for future generations.

The primary objective of the prescribed burn at Rocky Flats is to effectively manage and enhance the health of the rare prairie ecosystem found here; the secondary objective is to reduce the fuel load in the Site's grasslands. Over the years, suppression of natural fires has resulted in buildup of dead vegetation, called "thatch". Unless reduced through prescribed burning, this thatch will serve as fuel for an unplanned, uncontrolled wildfire, which could escape the Site and threaten nearby residential areas. Under natural conditions, prairies, both Western and Midwestern periodically burned. Prairie species are adapted to this periodic burning, and in fact some rely on fire for their reproductive success. Both natural and prescribed fire maintains, nurtures and enhances prairie habitat through recycling of nutrients, removal of thatch, and suppression of invading nonnative vegetation.

For several years local fire officials have voiced concerns about the buildup of fuel in the Rocky Flats grasslands. The most natural method for controlling fuel buildup is prescribed burning. Resulting fuel reduction will help ensure that uncontrollable wildfires at Rocky Flats do not reach surrounding communities. Neighboring local governments including Jefferson County, Boulder County, and the National Forests routinely use prescribed burning to effectively manage native ecosystems, reduce wildfire potential, and protect private property.

In 1998 DOE held public meetings, obtained public comment, and issued a natural resource management policy for the Site. It is DOE policy that prescribed burning be

used in the Rocky Flats grasslands to effectively manage rare prairie habitat, reduce the wild fire potential thus protecting both Site facilities and adjacent private property, and to aid in the control of noxious weeds.

➤ **What is a prescribed burn?**

A prescribed burn (also called “controlled burn”) is fire that is set intentionally according to a specific set of rules (or a procedure). These rules detail conditions that must be met to keep the burn under control and accomplish intended objectives. Just as a doctor prescribes medicine to treat a patient’s illness, ecologists prescribe burning to restore the health of grassland vegetation. For each prescribed burn, a Burn Plan that spells out specific rules and directions to control how the burn is conducted is issued. If the rules and directions can't be complied with on a given day, the burn is not started. If the conditions change to the extent they no longer correspond with the prescription, the fire is extinguished. The United States Forest Service (USFS), which has extensive experience in controlled burns of this type, has prepared a burn plan for the Site, and will be conducting the burn.

➤ **What does a prescribed Burn Plan look like?**

A prescribed Burn Plan is written according to a standard format that states why the fire is being used and how the fire will be controlled to achieve specific program objectives. A Burn Plan has been developed for the prescribed fire that will be used for grassland management of certain designated sections of the Rocky Flats Buffer Zone. Should we not be able to conduct the burn at this time due to weather conditions or other factors, this plan will remain approved for these designated sections through the end-date of the plan approval, April 2001.

➤ **Why does the burn plan say it is effective through April 2001?**

If all the conditions required in the burn prescription cannot be met during the open time window in 2000, then the burn will not be conducted this year. The Burn Plan allows for burning during the same time periods, in the same areas, with the same prescribed weather conditions in the year 2001.

➤ **Who can conduct a controlled burn?**

The prescribed burn must be conducted by qualified, certified controlled burn firefighters only. These people go through extensive classroom training, and must pass rigorous physical tests. The leader of the team, the "Burn Boss", has special qualifications and training for controlled burning as well as wildland fire fighting. The Burn Boss will rely on a team of qualified and specially trained people who will ensure that the burn goes as planned, and that everyone involved remains safe. Other persons holding responsible positions include assistants to the Burn Boss, a Safety Officer, a Holding Boss, and a number of firefighters. A Smoke Monitor will ensure that the smoke is not too heavy in high traffic or residential areas.



➤ **Will there be a lot of smoke?**

Dry grass burns quickly, typically producing limited amounts of light gray smoke, rather than dense dark smoke produced by controlled burns in forested areas. The weather conditions needed for the prescribed fire will encourage rapid smoke dissipation. Burning will be stopped early enough in the day that smoke can dissipate before cooler night air forces it into lower areas. The hours for active firing will be from approximately 9:00 am to 2:00 pm, depending on weather. A standard computerized smoke behavior model, using the weather conditions required by the prescription, predicted air quality conditions during the controlled burn. This model predicted that no violations of air standards will occur as a result of the burn.

Smoke will be monitored to be sure that it does not cause visibility problems on roadways or in residential areas. If smoke becomes too dense, the burn will be stopped. Should smoke cross the highways, contingency arrangements have been made with the Colorado State Patrol so that the State Patrol will be present to ensure traffic safety.

➤ **What time of day will the fire be conducted, and what will the weather be like?**

The fire will be conducted between 8:00 AM and 4:00 PM. A prescribed burn cannot be conducted unless weather conditions are dry, and there has been no recent precipitation. Ground fuels must be dry to ensure proper combustion. The prescribed wind speed is between 2 mph to 10 mph. If sustained gusts reach 15 mph, the fire will be stopped..

➤ **How do you know if the conditions in the prescription are being met, and the prescribed fire can be started?**

A weather forecast for the day of the burn will be obtained before any ignitions take place. If the weather forecast is favorable, and the current weather conditions match the limitations of the prescription, a test fire will be lit in representative fuels, usually at the initial corner of each area to be burned, called a “unit”. If the results are as desired, the controlled burn will be started. The fire behavior will be monitored constantly during the burn. If prescription parameters are exceeded while a unit is being burned, ignition will cease and the burn will be extinguished as soon as reasonably possible. If conditions again come back into prescription on the same day, the fire may be re-started.

➤ **What is an ignition plan?**

The ignition plan directs the way a burn unit is burned. The Burn Boss directs the pattern of ignition throughout the burn in each unit in keeping with the prescription and in response to changing climatic conditions.

➤ **What does “Holding” mean?**

Holding means controlling the fire, that is, keeping the fire under control and within the intended area. Holding activities includes periodically checking previously burned areas for possible hotspots or escape across control lines.

➤ **What is a “flapper”?**

A flapper is a hand tool that is used to slap out flames. It is similar to a mud-flap on a broomstick. When the hard rubber blade is flapped down onto a flame, it will smother the flame and stop the fire’s spread at that location. This tool is highly effective in controlling grass fueled fires.

➤ **What does a "Rate of Spread" in chains/hour mean?**

A chain is a unit of measure, equaling 66 feet. This is a standard unit of measure used by surveyors and foresters. How fast the fire moves in an hour is measured in chains rather than in feet or miles.

➤ **What does “probability of ignition” mean?**

Simply put, under the current weather and fuel moisture conditions at a particular site at a specific time if one were to throw out 100 burning matches, how many of those matches would start a sustained ignition. Probability of ignition is given in a percent.

➤ **What does the information in the tables in the Burn Plan mean?**

Tables 1, 2, and 3 are displays of results from fire behavior prediction models. The Burn Boss and his assistants will use these tables to predict the fire behavior as work progresses. Table 1 shows the relationship between fine fuel (small fuel such as dried grass and leaves) moistures and wind speed on mid-flame length. Knowledge of mid-flame length is used by the fire specialists to interpret Table 2, which predicts rate of spread. Using these two tables, fire specialists know how fast the fire will progress, and can form strategies for retaining control. They can also determine when a fire must be extinguished because elements of the prescription will be exceeded. Table 3 provides the fire specialists with information on the effects that fuel moisture and the cooling effect of shade will have on the probability that the fuel will ignite and carry the flame as desired. These effects vary according to the ambient air temperature.

On the day of the burn, the Burn Boss will monitor the amount of fuel that is consumed by the fire. According to the prescription, at least 40% of the dead vegetation must burn to achieve intended results. If less than 40% is being burned, the burn is unsuccessful at meeting that specified part of the prescription, and thus the burn would be stopped. After the burn, ecologists will monitor control and treatment plots to compare with burn areas. Before any actual conclusions can be drawn on the success of meeting the burn’s

resource management goals, data collection over at least one full growing season will be necessary. Over time, monitoring will show whether the desired results were achieved.

➤ **What is meant by "Complexity" and "Risk Assessment" in the Burn Plan?**

For the Rocky Flats Prescribed Burn the National Wildfire Coordinating Group's, "Prescribed Fire Complexity Rating System Guide" (PMS 424) was used. This is a nationally recognized system for rating controlled fires. The broad concept in analyzing complexity and assigning risk for a fire is to consider three fire complexity factors. Factor 1 is "Risk" – the probability that an unplanned event or situation will occur. Factor 2 is "Potential Consequences" – a measure of the cost or result of an unplanned event. Factor 3 is "Technical Difficulty" – a measure of the skills needed to deal with the unplanned event and its consequences. These three factors are assigned low, moderate, or high complexity ratings based on a worst-case scenario development. These complexity ratings for all three factors are then combined to produce an overall complexity assessment. The final complexity rating is based on rating factors, local knowledge, and professional judgement.

The Rocky Flats prescribed burn received a moderate complexity rating largely due to public concerns. A controlled grassland burn of this nature is normally considered of low risk.

- **The detailed Burn Plan is not yet available for public review. Also, we have not yet seen the CDPHE permit modification. The state-permitted window for conducting the burn is already in effect.**
- **The US DOE is urged to obtain the burn plan and provide a copy to the City of Westminster and concerned residents before the burn.**

The burn plan was provided to local governments and interested local citizens on March 17, 2000, prior to the prescribed burn. CDPHE re-issued the burn permit on March 7, 2000.

- **Can you rake up the "mat" of vegetation in the Buffer Zone, sector by sector, rather than burn this vegetation?**

Physical removal of thatch by hand, microbial solutions, or by mowing and removal of the undercover thatch material (fuel load), as well as insect control for weed management would not be as effective and practical as conducting a burn. The DOE is concerned that mechanical raking would have negative effects on the prairie because of disturbance and compaction of soils. Additionally, the residue left from the burn contains nutrients would be helpful in rejuvenating growth of native plant species.

**B. AREA TO BE BURNED**

- **How can you be sure that the areas you plan to burn are not contaminated with radioactive materials?**
- **Will the smoke be contaminated with radioactive materials?**
- **Are there contaminants other than plutonium in the areas you intend to burn?**





There is no known radiological soil contamination in the areas to be burned. The Buffer Zone surrounding the former production area (Industrial Area) has been extensively investigated and evaluated for the extent of contamination. Soil in areas surrounding known, or detected, significant areas of contamination have been thoroughly sampled, and the patterns of contamination have been defined and characterized. Actual samples of soils in the proposed burn areas, and in intervening areas, are consistent with the assumption that the majority of the observed contamination comes from the 903 Pad Area. This is where drums of plutonium-contaminated oil and solvents leaked onto the ground. Contaminated soil from this location was wind-blown in a characteristic downwind plume pattern, mostly toward the east and southeast of the pad itself. In all of the native prairie areas to the west of the Industrial Area, soil samples show a level of contamination very slightly above background, and consistent with this distribution pattern. Only in areas where burials or other disposal activities were known to have occurred do the soils deviate from that 903 Pad Area plume pattern. Those specific soil areas needed and received additional characterization to verify the extent of the contamination around them.

Computer modeling of radiological emissions during a hypothetical burn in part of the more highly contaminated 903 Pad Area plume area showed such a burn did not pose significant exposure risk. In this hypothetical fire, a firefighter on the fireline would receive a hypothetical dose of 0.014 millirem (mrem), and the closest possible public receptor at the Rocky Flats east gate would receive a hypothetical dose of 0.0061 mrem, and at the nearest residence the hypothetical dose would be 0.0029 mrem. (A millirem is a measure of radioactivity dosage to people.) For perspective, the average dose received by an individual living in the Front Range of Colorado is typically about 400 mrem/year. As a specific example of normal public exposure to radiation, the dose from a single standard chest X-ray is around 8 mrem.

In addition to consulting the extensive results of sampling performed over the past decade, other actions have been taken to ensure that the burn is placed in areas without elevated contamination levels. The Historical Release Report, published in 1992, was examined to ensure that these areas were free of historical releases. The Historical Release Report was based on old reports, interviews with past and present employees for any knowledge on past, unrecorded disposal practices at the site, and any other existing records of disposal available. To ensure that the burn areas are free of old, disused disposal pits, refuse piles, and other undocumented waste, each area was recently subjected to a thorough walkdown. No unnatural disturbances or unusual vegetation patterns were observed, indicating the lack of previous soil excavation, and no suspicious debris was found.

### **What is "background" for plutonium in the areas to be burned?**

Soil measurements of plutonium in and around the areas to be burned are less than 1.0pCi/g, and are often less than 0.1pCi/g. As an example, eighteen soil samples taken in and around the southern burn areas ranged from 0.008 to 0.55pCi/g, with an average of 0.132pCi/g.



- **Have you taken and analyzed soil and vegetation samples from the areas you intend to burn? Please describe the sampling and your results.**
- **Has there been a complete radionuclide analysis of soil and vegetation in proposed burn area for all isotopes?**
- **Performing an uptake analysis on vegetation and ground litter in the areas to be turned would do much to assure the community that the smoke from the proposed prescribed burns does not contain contamination and radionuclides.**

Soil samples from the areas have been analyzed for uranium, plutonium, and americium isotopes, and the areas are outside any known contamination. Please see the maps available at the March 27 public meeting for distributions of plutonium and uranium relative to the proposed burn areas.

The DOE's contractors have analyzed five vegetation samples for uranium, americium, and plutonium. Preliminary results indicate these concentrations are negligible.

- **Based on soil classification and other factors, what portion of the site are these studies intended to represent for purposes of refining previous estimates of the soil resuspension factor? Due to the high rock/pebble content of these soils are these areas expected to have a lower soil resuspension potential compared to other areas on site such as hillslopes and valley areas?**

The DOE will perform wind tunnel studies on the burn areas to better estimate the potential for soil resuspension. This is being examined to help evaluate the recent recommendation by a citizen's oversight group to lower the Site's soil cleanup level for plutonium. The studies performed previously included areas with lesser amounts of rocky soil, and included one test series on the flats near the edge of Standley Lake. The wind tunnel study will characterize the resuspension conditions for the areas studied. If one wants to infer from those results what might happen in other areas, and under other conditions, one could do so, with obvious caveats. For example, should these results be extrapolated into an area with higher organic content than the soils being characterized by the study, one would have to take into account the higher nutrient content and probably higher moisture availability (and retention) for the area. Such soil conditions would be conducive to more rapid recovery of the overgrowth, and would possibly lead one to conclude a lesser long-term resuspension effect would prevail. Remember that we are not looking at erosion potential, only air quality effects, so the issues have to do with the ability of moving air to come into more direct contact with the soil surface. Once we have an overgrowth, there is limited potential for resuspension due to wind events.

- **How do you know that contaminated equipment has not been buried or waste materials have not been dumped in the areas that you will burn?**
- **The Church lawsuit indicates that site workers placed contaminated sewage sludge in the north Buffer Zone; is this true? Do you intend to burn that area now or in the future?**

- **Testimony from the Church lawsuit indicates that a contaminated ambulance and other contaminated wastes were buried and dumped in the Buffer Zone. How do you know that you will not burn areas in which contaminated materials were dumped?**
- **Due to the concern that dumping of waste materials might have occurred in these areas have any geophysical methods been employed to survey the area for near-surface waste-related materials? Why does RFETS feel that a simple walk-down is sufficient to alleviate these concerns?**

Based on reviews of Site records, we have no such concerns with dumping of waste materials in these areas. As far as further characterization of the surface soils, such characterizations, no matter how detailed, can only be designed to detect dispersed contamination. On flat areas such as those proposed for this burn, such contamination would have to result from a release to the air from a significant exposed source area. Distributions of contamination at the Site clearly show the impacts of such releases, primarily from the 903 Pad area. The soil samples in and around the proposed burn areas are consistent with the projected isopleths from areas downwind of well documented areas of contamination. No anomalies have been detected that would lead one to conclude that a contaminant trajectory has not been accounted for. For further information, please see the paper “Controlled Burns in the Buffer Zone: How Do We Know They’re Safe?” available at the March 27 public meeting.

- **Could a hot wildfire cause reducing or oxidizing conditions that would change the oxidation state of plutonium in the soil to a more mobile form?**

Plutonium in the buffer zone exists in the oxide form, which is insoluble and not easily mobilized. We do not anticipate high soil temperatures will result from the proposed relatively fast moving controlled burn. The design of the prescribed burn is intended to promote a fast moving fire with less than 100 percent fuel depletion. The actinide migration soil modeling group has proposed that temperature sensors be installed prior to the burn to monitor the surface temperature at several locations throughout the burn area. These sensors will be installed and are intended to assist actinide experts interpret any observed changes in the soil collected post-burn.

- **What studies in the last 10 years have determined what USA background levels in soil/air/water are for various radioisotopes like Pu-239, Pu-240, Pu-238, Am-241, U-233, U-234, U-235, U-238, etc.?**

The EPA maintains a database and produces a quarterly report, available on their website, that provides annual summaries of soil contaminant levels at various locations around the nation.

## C. SAFETY/FIRE CONTROL

### ➤ **How can you predict what a fire will do?**

Controlled burn professionals use fuel models during fire prescription development to help predict fire behavior. For the Rocky Flats prescribed fire, we used the Fire Behavior System of Fuel Models. This model has been calibrated against actual burns, and can predict fire behavior characteristics like intensity and severity. The tall grass prairie of Rocky Flats best fits with a Fuel Model 1. The results are shown in Table 1 to provide information to the fire personnel on how the fire will behave.

Another model that was used is the smoke prediction model commonly known as SASEM, or Simple Approach Smoke Estimation Model. This is a smoke dispersion model designed to predict ground level particulate matter and visibility impacts from burning vegetation. This model was used to predict smoke impacts on air quality as mentioned above.

### ➤ **How do you make sure the firefighters and observers stay safe?**

To keep the emphasis on safety, all personnel assigned to the fireline will attend a safety and organization meeting before the fire. The meeting will address risks from being on the fireline, safety procedures, escape routes, and other information to ensure personal safety. All personnel on the fireline will be required to wear special fire-proof clothing and have other standard wildland fire safety equipment.

There is a separate safety plan to ensure the safety of observers. All observers will be accompanied by Rocky Flats personnel familiar with safety procedures and escape routes. Only approved personnel may be on the fireline or at established remote observation points. Casual visitors and observers will not be allowed in the controlled burn areas.

- **Do you have a contingency plan in case the fire escapes?**
- **The DOE should prepare an emergency preparedness plan in the event that the winds shift or win velocity significantly increases during the burn. Such a plan is also provided to the State Office of Emergency Preparedness, the City of Boulder and the Boulder community and other potentially affected communities prior to the public meeting.**
- **The U.S. DOE is urged to prepare an emergency preparedness plan in the event of a wind shift and provide such a plan to the State Office of Emergency Preparedness, the City of Westminster and the community prior to the public meeting.**

The burn plan contains a Contingency Plan describing the emergency response in the highly unlikely event of loss of control of the prescribed burn. The Rocky Flats Fire Department will be standing by and available to support the US Forest Service. The Contingency Plan was sent to the organizations listed before the public meeting.

In the event the fire escapes the designated areas, the contingency plan spells out what to do. The first step will be immediate control of any escaped fire. If the situation escalates, additional help will be called in, including other fire departments with mutual aid agreements with Rocky Flats. The onsite controlled burn firefighters and Rocky Flats Fire Department would be the first responders to suppress the escaped fire and would take action while the request for additional fire personnel was broadcast. Other immediate steps would include (1) alerting employees, and nearby residents; (2) monitoring smoke; (3) controlling traffic; and (4) containing or monitoring non-escaped portions of the burn. It is highly unlikely that an escaped fire could threaten the Site buildings or endanger onsite employees, but if evacuation were necessary, standard plans at the Site would be implemented. As mentioned above, the chain of command in contingency situations is designated in the Burn Plan.

The Rocky Flats Shift Superintendent has the authority to declare an operational emergency if the fire gets out of control, or simply to assign resources to the fire as needed to regain control. If an emergency is declared, the Site Emergency Operations Center would be activated and appropriate notifications to State and local governments would be made. Emergency operations at Rocky Flats are governed by the Site's Emergency Plan, which has been filed with the State.

- **The Burn Plan says that the U.S. Forest Service Personnel and other cooperators will not be used if the fire escapes into a Soil Contamination Area. Does that mean a fire that escapes to a contaminated area won't be suppressed? Who will control the fire?**

No. First, the controlled burn areas are quite distant from contaminated areas, and it would take quite a while for an escaped fire to burn that far. This would allow sufficient time for fire personnel to establish intermediate control lines between the escaped fire and a contaminated area. Second, an escaped fire would have to cross several manmade or natural firebreaks to reach such an area. In the event of an escaped fire threatening contaminated areas, these firefighters would switch roles with Rocky Flats fire personnel. If an escaped fire reached a contaminated area, Rocky Flats fire personnel, who are trained for entry into such areas, would take over fire fighting and fire personnel from the U.S. Forest Service and other cooperating fire departments would provide support. The fire suppression activity would not be stopped, merely transferred from one group to the other. The fire would still be brought under control.

- **DOE should fortify its dirt road infrastructure with additional gravel to serve as fire breaks.**

The 40-foot-wide gravel-road fire breaks in the RFETS Buffer Zone are appropriate for the planned prescribed burning activities.

➤ **What about the safety of the firefighters, onsite employees, and the public?**

There are several levels to the safety planning for this burn. There is a specific plan to allow news media representatives and others observe the burn without being too close to the fire front. This plan provides escape routes from designated observation points should they be needed. The Burn Plan calls out expected hazards for fireline personnel as part of a job hazard analysis. Initial medical response will be requested through Rocky Flats Fire Department should an injury occur while the fire is underway. The Burn Plan specifies the chain of command to be used in the very unlikely event of an escaped fire. The Communications Plan provides the framework for immediately notifying the public should there be an emergency involving public risk. The Rocky Flats Fire Department will have a full shift of personnel on the Site, but not conducting the controlled burn, as part of the contingency response team. Should they be required, a full crew of Rocky Flats firefighters will be able to respond within just a few minutes. The Burn Plan identifies the initial response to an escaped fire, including when command and control would be transferred to the Rocky Flats Fire Department.

➤ **DOE should convene a group comprised of members of the concerned public, health specialists, specialists in radioactive contamination, specialists in fire control, and specialist in vegetation management to devise a plan that is protective of public health, reduces the chance of a large natural fire, and is acceptable to the public.**

The Site has convened a team of qualified specialists, obtained advice from the Colorado Division of Wildlife, the US Forest Service, Boulder and Jefferson counties and local environmental groups. It has conducted planning in accordance with the National Environmental Policy Act, held public meetings a year ago and incorporated public suggestions into its planning and considered public comments in its decision.

D. AIR MONITORING

- **Can you conduct a test burn, take air samples, analyze those samples and report your results to the public before you conduct the prescribed burn? Burn a small area and analyze the air monitors and the ash from that burn and make the information available to the public.**
- **How will air quality be monitored during the burn?**
- **Information related to the ability of the air monitoring system to capture small particles should be made available at the public meeting. The low-volume and high-volume samplers were seriously deficient in picking up certain small, lightweight particles.**
- **DOE should conduct an experimental small-scale burn in a controlled sealed/contained environment of vegetation and thatch with varying contents of moisture to determine the levels of concentration of radionuclides and toxic materials and particle size distribution of residual material that is emitted as a vapor/aerosol phase and that which remains in the solid phase as residual ash.**

- **DOE should provide factual information from the experimental contained burns and small burn area to elected officials in Boulder and surrounding communities and the public to serve as a baseline on which future decisions regarding further burns will be made. This should be done prior to continuing a larger scale burn.**

A test burn will be conducted prior to the main burn. Air monitoring will be conducted during the test burn; the results will be evaluated and shared with local communities prior to the main burn. The Site's perimeter air monitoring network will monitor conditions during the burns, and the DOE will install long-term monitors in burned areas to record conditions following the burns. The results of all air monitoring will be shared with the public.

- **What type of apparatus will be used to monitor the plume smoke? Specifically, what type of probe will the instrument have? What type of filters will be employed? Are the filters and the instrument heat resistant? Is the monitor hand-held or a fixed-stationary unit?**

The smoke will be monitored using a Mini-Vol air sampler. The sampler will be positioned on the leading edge of each burn segment just before that segment is lit. The sampling cart will be repositioned in turn as each subsequent segment is lit. The filters will be quartz and Teflon. Experience with these sampling substrates indicates that their efficiency will exceed approximately 98%. They will not be exposed to direct flame, nor will any of the ancillary apparatuses. The units will be stationary during each burn segment. Please note that the burn will progress in small segments within each burn area; it is not planned as one continuous large scale burn.

- **How long will the HVOL sampler stationed in the middle of the burn area be operated? Is it appropriate to turn off the monitors once resuspension appears to reach a low level, or should other factors such as condition of plant cover and weather conditions be considered prior to turning off and removing the air monitor? If so, what are these specific criteria?**

The High Volume sampler will be operated for several months, the actual duration to be determined by review of the data, both from the samples and from recovery information concerning the surface foliage. We anticipate seeing somewhat increased mass concentrations in the burned area as compared to the clean area that is being sampled nearby. As long as that condition prevails, we will collect samples to be analyzed for mass. We anticipate that the actual loading conditions could become indistinguishable between the two filter substrates in as little as three months time, or distinguishable conditions could prevail for longer periods. We also must recognize the dust sources other than those associated with the burn could influence the results. We will attempt to minimize such effects by the choice of sampling locations and through periodic observation of changes in the source areas that could have potentially anomalous influence on the results. To determine whether we have reached an equivalent condition at the two sampling locations we will have to invoke paired statistical tests on the results. Such tests will be performed on intervals of data, ranging from a few weeks to as long as



the entire project duration. While such statistical tests may not be necessary in the short term, assuming dramatic differences between the burn-area sample and the non-burn-area sample, the test should be useful for determining end-point conditions.

We do not understand the question with regard to consideration of weather conditions. The study is to determine, semi-quantitatively, the influence a burn will have on air quality near the area that has been burned. The duration of the study, and the length of each individual sampling period will span a number of weather conditions, including stormy periods and dry periods, assuming we have relatively normal spring and summer conditions. There is no attempt or claim to represent all possible weather conditions that might occur at the Site, for all seasons and all environmental conditions. We will sample under the field conditions as they exist through the sampling period. We should be able to correlate sample pairs with weather conditions should such influences become a significant factor.

Please keep in mind that we will be sampling ambient air. A relatively large fraction of the mass in an air parcel is associated with transported particulate matter that does not originate near the receptor. It is not possible, nor feasible, in the study proposed here to determine the origin of the mass being collected on the samples. In this particular set of measurements, we are looking for gross changes in the air quality characteristics. Extremely small changes detectable only through statistical manipulation of the sampling results can be examined but are not the immediate goal of this study element.

➤ **Are there any DOE studies on radionuclides in smoke from fire in contaminated environs (building/vegetation/etc.)?**

Yes. A good reference that provides summaries of a number of studies relating the airborne release fraction with various release mechanisms, including fires in uncontained cellulosic materials, may be found in “DOE-HDBD-3010-94,” Volume 1. In those uncontained cellulosic” studies, the airborne release fractions ranged from 3.4 E-6 to 7.0 E-1. These studies were laboratory studies performed on shallow depths of material, and were considered conservative in their results.

Additionally, in December 1999 CDPHE released a report entitled “Buffer Zone Brush Fires Investigation” summarizing the results from the State’s air monitors during the wildfires at the Site in 1994 and 1996. This report did not find measurable air contamination resulting from either fire.

E. PUBLIC INFORMATION

- **Your (the US DOE's) final Environmental Assessment of the 1999 Vegetation Management Plan was not published until after the weed spraying (aerial application of herbicide) was started.**
- **The Sierra Club requested an extension to the comment period on the Vegetation Management Environmental Assessment (EA) issued in 1999; that request was denied? Why was this request denied?**

- **DOE must make every effort to provide opportunities to ensure confidence by providing informational public meetings at least 60 days beforehand when considering controversial issues such as controlled burn at Rocky Flats. Keeping the public informed, with understanding and support, and allowing them to participate in cleanup decisions is necessary if DOE is to achieve a "safe," timely cleanup and closure of Rocky Flats with public understanding and support.**

The US DOE prepared a Buffer Zone natural resource policy two years ago that included application of prescribed burning in the Site's Buffer Zone. Public meetings were held; public involvement was obtained.

An extension to the comment period on the Vegetation Management Environmental Assessment (EA), issued in 1999, was requested by the Environmental Information Network, but refused. It would not have been fair to do differently with the Sierra Club. The rationale given we gave both organizations for denying their requests was that there had been a series of public meetings held for scoping, sharing information, and discussion of the alternatives; the meetings and the publication of the draft were all advertised through community advisories that go to a long list of individuals and organizations; the draft EA was mailed to a list of the people who had expressed an interest; the EA was available on the RFFO web site; and DOE felt the draft had been adequately distributed with adequate time for review. DOE told them to go ahead and submit their comments and they would be considered if possible. In the end, DOE considered and responded to everybody's comments no matter how late they were submitted.

- **The DOE should conduct a formal public meeting prior to the burn in order to address the concerns raised by residents of Boulder and other communities.**
- **The City of Boulder encourages the Rocky Flats Coalition of Local Governments (RFCLOG) and the Rocky Flats Citizen's Advisory Board (CAB) to take an official position asking DOE to delay the burn until they are satisfied that there will be no negative impacts to human health and the environment as a result of any burn.**

The Department will hold a final public meeting on March 27, 2000.

- **How will the community be notified of the prescribed burn?**

Public communication about prescribed burning formally began in 1998 during assessment of environmental impacts from various vegetation management alternatives for the Rocky Flats Buffer Zone. It was first presented to the public in the Draft Vegetation Management Environmental Assessment (EA) in 1998, and again in April 1999 when the Final EA was published. More recently, extensive outreach was conducted to promote public awareness of plans to conduct prescribe burning this spring. Outreach methods included community and media advisories, public meetings, site tours, and briefings for the Rocky Flats Citizens Advisory Board and city and county officials.

DOE has developed an extensive Communications Plan for the Rocky Flats Controlled Burn.. Implementation of this communications plan started several weeks ago, and will continue as implementation of the Burn Plan approaches. Within 24 hours of the start of

the prescribed burn, media advisories and public service announcements will be issued to promote public notification through the news media. Also within 24 hours of the start of the prescribed burn, community advisories will be faxed or e-mailed to individuals on Rocky Flats' community advisory distribution list. Media advisories, Public Service Announcements, and/or Community Advisories will be issued immediately before the fire is lit and after the fire is extinguished each day prescribed burning is conducted.

To add your name to the community advisory distribution list, please call Anna Martinez, DOE Communications, at (303) 966-5881.